What is claimed is:

1. An arteriovenous graft defining a lumen for passage of blood, comprising:

a first end defining a first orifice having a first diameter, the first end adapted for placement into a vein with the first orifice positioned at a location spaced downstream from an entry location of the first end into the vein for passage of blood from the lumen into the bloodstream;

a second end adapted for attachment to an artery; and

a first tubular section between the first and second ends, the first tubular section defining a portion of the lumen having a second, generally constant diameter greater than the first diameter.

2. The graft in accordance with claim 1, wherein the first end is adapted to position the first orifice a distance of one to three centimeters from the entry location.

3. The graft in accordance with claim 1, wherein the second diameter is at least about 20% greater than the first diameter.

4. The graft in accordance with claim 1, wherein the second diameter is at least about 30% greater than the first diameter.

5. The graft in accordance with claim 1, wherein the first diameter is from about 3.5 to about 4.5 millimeters and wherein the second diameter is from about 5.5 to about 7.0 millimeters.

6. The graft in accordance with claim 1, further comprising a first taper section between the first end and the first tubular section, and having a generally gradually increasing diameter along the first taper section.

7. The graft in accordance with claim 6, further comprising a second tubular section between the first end and the first taper section, the second tubular section defining a portion of the lumen having a generally constant diameter corresponding to the first diameter.

8. The graft in accordance with claim 6, wherein the longitudinal length of the first taper section is less than about 2 centimeters.

9. The graft in accordance with claim 6, wherein the first taper section is positioned from about 1 to about 10 centimeters from the venous end.

10. The graft in accordance with claim 6, wherein the first taper section extends from the venous end to a longitudinal point at least about 4 centimeters from the venous end.

11. The graft in accordance with claim 7, wherein the arterial end defines a second orifice having a third diameter less than the second diameter; and the graft further comprising a second taper section between the first tubular section and the second end, the second taper section having a generally evenly decreasing diameter.

12. The graft in accordance with claim 11, further comprising a third tubular section between the arterial end and the second taper section, wherein the third tubular section defines a portion of the lumen having a generally constant diameter corresponding to the third diameter.

13. The graft in accordance with claim 12, wherein the second diameter is at least about 20% greater than the third diameter.

14. The graft in accordance with claim 12, wherein the first diameter is from about 3.5 to about 4.5 millimeters; wherein the second diameter is from about 5.5 to about 6.5 millimeters; and wherein the third diameter is from about 3.5 to about 4.5 millimeters.

15. The graft in accordance with claim 12, wherein the first tubular section has a length that is at least about 60% of the length of the graft.

16. The graft in accordance with claim 1, further comprising a cuff affixed to the outer surface of the graft at least about 1 centimeter from the first orifice, the cuff defining a groove configured to receive a purse-string suture in the vein wall for a venous anastomosis.

17. The graft in accordance with claim 16, wherein the groove lies generally on a plane that is at an angle of about 45 degrees to a longitudinal axis of the graft.

18. An arteriovenous graft defining a lumen for passage of blood, comprising:

a first end adapted for placement in a vein through a wall of the vein and defining a first orifice having a first diameter;

a second end adapted for attachment to an artery;

a first tubular section between the first and second ends, the first tubular section defining a portion of the lumen having a second, generally constant diameter greater than the first diameter; and

a first taper section between the first end and the first tubular section, and having a generally gradually increasing diameter along the first taper section.

19. The graft in accordance with claim 18, wherein the first end is adapted to position the first orifice a distance of one to three centimeters from the entry location.

20. The graft in accordance with claim 18, further comprising a cuff affixed to the outer surface of the graft at least about 1 centimeter from the first orifice, the cuff defining a groove configured to receive a purse-string suture in the vein wall for a venous anastomosis.

21. The graft in accordance with claim 18, further comprising a second tubular section between the first end and the first taper section, the second tubular section defining a portion of the lumen having a generally constant diameter corresponding to the first diameter.

22. An arteriovenous graft defining a lumen for passage of blood, comprising:

a first end defining a first orifice having a first diameter, the first end adapted for placement into a vein with the first orifice positioned at a location spaced downstream from an entry location of the first end into the vein for passage of blood from the lumen into the bloodstream;

a second end adapted for attachment to an artery;

a first tubular section between the first and second ends, the first tubular section defining a portion of the lumen having a second, generally constant diameter greater than the first diameter; and

a cuff affixed to the outer surface of the graft at least about 1 centimeter from the first end, the cuff defining a groove configured for attachment with the vein wall for a venous anastomosis.

23. The graft in accordance with claim 22, wherein the groove lies generally on a plane that is at an angle of about 45 degrees to a longitudinal axis of the graft.

24. The graft in accordance with claim 22, wherein the cuff is positioned from about 1 to about 10 centimeters from the first end.

25. The graft in accordance with claim 22, wherein the cuff is positioned from about 1 to about 3 centimeters from the first end.

26. The graft in accordance with claim 22, wherein the cuff comprises:

a tubular member defining a lumen sized to engage an external surface of the graft; and

first and second ridges extending around the member and defining the groove therebetween.

27. The graft in accordance with claim 22, wherein the cuff comprises:

a first ring member affixed to the graft; and

a second ring member affixed to the graft;

wherein the first and second ring members define the groove therebetween.

28. The graft in accordance with claim 27, wherein the first ring is positioned from about 1.5 to about 2 centimeters from the first end and wherein the second ring is positioned from about 2 to about 2.5 centimeters from the first end.

29. The graft in accordance with claim 27, wherein the first ring is positioned about 1.75 centimeters from the first end and wherein the second ring is positioned about 2.25 centimeters from the first end.

30. A method of implantation, comprising:

making an incision in the wall of a preselected target vein;

providing an arteriovenous graft defining a lumen for passage of blood, the graft including:

a first end adapted for placement in a vein through the incision and defining a first orifice having a first diameter;

a second end adapted for attachment to an artery;

a first tubular section between the first and second ends, the first tubular section defining a portion of the lumen having a second, generally constant diameter greater than the first diameter; and

a first taper section between the first end and the first tubular section, and having a generally gradually increasing diameter along the first taper section;

inserting the first end through the incision into the vein such that the first end passes to a point downstream of the incision;

securing the graft to the vein wall; and

anastomosing the arterial end of the graft to a preselected target artery.

31. The method in accordance with claim 30, wherein the graft is secured to the vein wall using a purse-string suture.

32. The method in accordance with claim 31, wherein the purse-string suture is inserted in a wall of the target vein prior to making the incision.

33. The method in accordance with claim 30, wherein inserting the first end comprises inserting the first end through the incision into the vein such that the first end passes to a point at least about 1 centimeter downstream of the incision.

34. The method in accordance with claim 30, wherein the vein has a diameter of less than about 1.5 centimeters.

35. The method in accordance with claim 30, wherein the vein has a diameter of no greater than about 1.4 centimeters.

36. The method in accordance with claim 30, wherein the vein has a diameter of no greater than about 1.3 centimeters.

37. The method in accordance with claim 30, wherein the vein has a diameter of up to about 3 centimeters.

38. The method in accordance with claim 30,

wherein the graft comprises a cuff affixed to the outer surface of the graft at least about 1 centimeter from the first end, the cuff defining a groove configured to receive a purse-string suture for a venous anastomosis;

wherein inserting the first end comprises inserting the first end of the graft through the incision into the vein such that the groove is positioned to receive the vein wall; and

wherein securing the graft comprises securing the vein wall to the cuff.

39. The method in accordance with claim 38, wherein the vein wall is secured to the cuff using a purse-string suture.

40. The method in accordance with claim 39, wherein the purse-string suture is inserted in a wall of the target vein prior to making the incision and wherein securing the graft comprises drawing the purse-string suture into the groove.

41. A method for providing an arteriovenous bypass, comprising:

providing a graft including a first end defining a first orifice having a first diameter, a second end, and a first tubular section between the first and second ends, the first tubular section defining a portion of the lumen having a second, generally constant diameter greater than the first diameter;

placing the first end into a vein with the first orifice positioned at a location spaced downstream from an entry location of the first end into the vein for passage of blood from the lumen into the bloodstream; and

attaching the second end to an artery.

42. The method of claim 41, further comprising orienting the first end in the direction of blood flow in the vein.

43. The method of claim 41, further comprising spacing the first orifice a distance of 1 to 3 centimeters from the entry location.

44. The method claim 43, further comprising securing the graft to the vein.